marketing approaches and providers early in its preparadigmatic stage. Artificially limiting the rate at which entrepreneurs can introduce competing visions of the appropriate approach to the market at this stage threatens economic efficiency in two ways. One is that slowing the speed at which the market can screen alternatives increases the likelihood that it will settle on a dominant approach before it has examined superior options further down in the queue.

For PCS, as with most communication industries, we can anticipate that an approach will be more valuable to each of its users the more widely it is used. This occurs because, among other reasons, the value of being able to use a technology to communicate with other users of the technology grows as their numbers increase,[12] and because the prices of products and services based on a new technology typically fall significantly as the number of users increases. This means that an approach that attracts a substantial group of users early in the preparadigmatic stage may have an

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[12] For example, Paul David argues that the standard arrangement of keys on keyboards for typewriters, workstations, and personal computers was developed in an era when mechanical typewriters made it desirable to slow the pace at which typists struck the keys. In the current era of electronic keyboards, other arrangements of the keyboard would make typing more efficient, enough so to more than compensate for the opportunity cost of the time required to retrain typists to work with alternative key layouts; but manufacturers of redesigned keyboards have not been able to find significant markets for their innovations because all typists are trained for the QWERTY key layout. At the same time, individual typists see no profit in developing proficiency with other keyboards when there are so few of these keyboards to work with. David, P., "Understanding the Economics of QWERTY: The Necessity of History," in W. Parker, ed., *Economic History and the Modern Economist*, Cambridge: Basil Blackwell, 1986.

insurmountable advantage over superior approaches brought to market at a later date.[13] Therefore, it is vital that there be a lot of experimentation as the industry is getting under way. If the market selects the best of a bad lot available early on, it may not be possible to introduce superior approaches later on. Slowing the pace at which the market can evaluate a wide range of options increases the likelihood that a suboptimal alternative will be chosen.

Second, even if the selection of suboptimal approaches was not a serious concern, there would still remain the potentially large opportunity cost of delaying the widespread implementation of the best approaches because the market's selection process was prolonged.[14] A simple example illustrates this point. Suppose we want to pick the best of ten candidate approaches and prior knowledge gives us no hint as to which is best. We could proceed by experimenting with each of them one at a time. If each experiment takes one period to complete and the best approach is obvious once its experiment has been run, then we would normally expect about

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[13] For a particularly lucid statement of this point, see David, P., "Some New Standards for the Economics of Standardization in the Information Age," in P. Dasgupta and P. Stoneman, eds., *Economic Policy and Technological Performance*, New York: Cambridge University Press, 1987. See also S. Besen and G. Saloner, "The Economics of Telecommunications Standards," in R. Crandall and K. Flamm eds., *Changing the Rules: Technological Change, International Competition, and Regulation in Communications*, Washington, D.C.: Brookings Institution, 1989, for an analysis of standard setting and standards coordination in telecommunication industries.

[14] In fact, even if the superior approaches were among the first tested, the market might be slow to adopt them because their superiority could not be established until a large number of options had been screened.

five periods to elapse before the best approach is revealed. More realistically, we would probably have to use ten periods to examine all of the approaches to determine on the basis of comparison which is best. (The opportunity cost of waiting through this type of process is one of the reasons the market may settle on an inferior approach before all options have been considered.) Alternatively, we might allow experiments with all of the approaches to proceed simultaneously during the first period. Comparing the results of these experiments would allow us to implement the best approach universally by the second period.

2. Applying Economic Theory to PCS: Small service areas will facilitate the development of PCS during its preparadigmatic stage

PCS Market Experiments. PCS clearly is at the very beginning of its preparadigmatic stage. To date there has been limited exploration of PCS technologies through the 150 plus experimental licenses granted by the FCC. Published reports and trade discussions of the range of PCS services that might be provided and the alternative technologies for delivering them show that the market will have a wealth of options to sort through once the spectrum required to offer these services is made available. But true preparadigmatic market testing of alternative approaches to PCS awaits the Commission's action in this rulemaking.

Applications currently projected for PCS include hand-held phones with low speed hand-off capabilities, one-way paging and messaging, CT-2, CT-2 plus paging, wireless loops specialized to both rural and urban requirements, cordless residential telephones, wireless PBXs and LANs, and a variety of mobile data services. Local exchange, cellular , cable television, paging, alternative access, MMDS, satellite, and public utility companies are all experimenting with ways to exploit economies of scope between PCS and the telecommunications systems they already manage. Of course each of these alternatives for delivering PCS can be used to supply a variety of services. Chances are, some of the current batch of PCS experiments will mature into services that one day will be offered widely. Many, probably most, of these approaches to PCS will disappear as the market renders its verdicts. But it is difficult to predict the winners and losers at this stage in the industry's development. Moreover, the market should allow for a flourishing of new services and technologies introduced over time as PCS providers seek to expand or substitute for their offerings and innovators seek to become PCS providers.

Large service areas may adversely affect the PCS industry's ability to quickly identify and develop a set of PCS services and technologies that meets marketplace needs in three ways—by reducing the number of market experiments, by obscuring important differences among various local communities they encompass, and by raising transactions cost

barriers to acquiring spectrum to develop PCS services targeted to the needs of local communities.

The potential for large service areas to reduce the number of market experiments with new approaches to PCS reflects the fact that the number of licenses sets an upper bound on the number of market experiments, while the number of licenses must vary inversely with the size of the territories licensed.[15] Of course the number of trials of truly different approaches to PCS will be much smaller than the number of licenses. Most license holders will not be 100 percent innovators themselves, but will rely in part on the results of other firms' experiments. The number of truly different experiments with PCS will also be reduced by inevitable similarities in the approaches trialed by many firms and by multiple licenses held by some firms.

When the combined effects of these factors are taken into account, it is clear that the number of licenses awarded may significantly constrain the market's ability to experiment with new approaches to PCS, even when the absolute number of licenses awarded might appear to be large. If, for example, we assume that the number of innovative PCS offerings is five percent of the number of licenses and five licenses are awarded per service area, then licensing the 734 MSAs and RSAs would result in about 183 market experiments.

[15] In general, there is no analogous constraint on the number of experiments with new products and technologies in industries that are not dependent on spectrum or other vital resources allocated by the government.

Licensing the 487 Basic Trading Areas would result in about 122 market experiments, which is considerably less than the number of firms that tried their hands at producing personal computers when that industry was in its preparadigmatic stage. Awarding five licenses to each of the 47 major trading areas would allow for only a dozen market experiments under these assumptions. So few market experiments would preclude many beneficial approaches to PCS.

Meeting Local Needs with PCS. Large service areas might also adversely limit the number of truly independent market experiments by obscuring important differences in their geographic subregions. In all likelihood, holders of PCS licenses for large service areas will implement area-wide approaches, or approaches focused on the needs of the largest population centers in these areas. Area-wide approaches in many cases may be the most productive use of PCS spectrum. The problem is that holders of licenses for large service areas may still implement area-wide approaches when different approaches targeted to the needs of local communities would produce greater benefits. This would not be a problem in an ideal world of perfect information and zero transaction costs, but in the real world the telecommunications needs of local communities are likely to be best understood by providers focused on telecommunications services in those communities.

Differences in the telecommunications needs and conditions of service between rural and urban communities and the ways that telecommunications providers and policy makers have responded to these differences illustrate the importance of variation among communities. Some of these differences are reflected in Table 1 on the next page, which compares LECs that borrow from the REA and the primarily rural participants in the National Exchange Carrier Association's (NECA) interstate access service tariff with the Regional Bell Operating Companies (RBOCs), whose telephone customers reside primarily in urban areas.

The statistics in the first two rows of Table 1 are reflections of the very different market environments faced by rural and urban telephone companies. The extremely low numbers of subscribers per route mile means that rural telephone companies have much higher non-traffic-sensitive costs per access line than do their urban counterparts. This is compounded by their inability to take advantage of economies of scale in switching that are available to urban telephone companies. The lower percentage of business access lines in rural areas also makes it more difficult for rural LECs to support high quality telephone services for residential subscribers because business users have traditionally made substantially more than proportionate contributions to common costs. Analogous concerns over the ability of rural markets to support stand alone cable systems

have prompted the exemption to the cable-telephone company cross-ownership ban for rural markets.[16]

Table 1

RBOC and Rural Telephone Company Comparisons

Statistic	REA Borrowers	NECA Participating Companies	RBOCs
Average subscriber density per route mile	6[1]	--	130[2]
Average Business access lines as % of total	14%[1]	18%[3]	32%[2]
% of U.S. access lines served[3]	4%	5%	72%
% of U.S. central offices[3]	--	28%	52%

1. Rural Electrification Administration, U.S. Department of Agriculture, *1991 Statistical Report, Rural Telephone Borrowers*, 1992.
2. United States Telephone Association, *1990 Statistics of the Local Exchange Carriers for the Year 1989*, 1990.
3. National Exchange Carrier Association, "Modernizing Rural America--A NECA Member Study," 1992; and United States Telephone Association, "Phone Fax--1992," 1991.

The importance of knowledge gained in the process of serving local communities is also reflected in the sources of

[16] The Commission has recently proposed increasing the population threshold for classifying an area as rural for purposes of qualifying for the exemption to include all areas with fewer than 10,000 people. Telephone Company-Cable Television Cross-Ownership Rules, Sections 63.54-63.58, Second Further Notice of Proposed Rulemaking, FCC 92-327 (August 14, 1992).

rural and urban PCS innovations described in pioneer preference requests. For the most part, pioneer preference requests for innovations in the provision of rural services have come from companies, including LECs, already providing rural telecommunications services. Pioneer preference requests for innovations with applications to urban areas have come primarily from firms serving urban areas. This is precisely the pattern we would expect to see if the opportunities for new services in local areas are most apparent to firms who already do business there. Licensing large service areas incorporating economically distinct subregions will encourage a focus on common denominator services with broader geographic appeal and make the development of services targeted to the needs of local communities less likely.

Market Failure Impedes Beneficial Partitioning. Large service areas would not hinder the development of PCS services targeted to the needs of local communities if there were no transactional barriers to breaking larger service areas up into smaller units (partitioning) when there were economic benefits to doing so. Unfortunately, the aggregation of heterogeneous subgroups of users can lead to a particular type of market failure in which license holders implement approaches that appeal to the population of the larger area as a whole when differentiated services targeted to the unique needs and conditions of the area's subregions would provide greater economic benefits.

The reasons why this type of market failure is likely to occur when diverse populations are incorporated in large service areas are easily illustrated. Consider, as an example, a single, licensed service area composed of four equal sized subregions, A, B, C, and D. The PCS license for the larger area could be implemented with an area-wide approach. While this approach may meet the needs of a substantial number of people throughout the area, it may fail to support different uses demanded in the different subregions. For example the configuration of micro cells and features supported by the area-wide licensee might be inadequate for the provision of wireless loops to remote locations in A, a wireless LAN in an industrial park in B, an advanced emergency communications service for a large hospital in C, and for a telepoint service to replace pay phones in a large regional shopping mall in D.

The area-wide licensee obtains some benefits from economies of scale and its users benefit from network externalities due to the implementation of the same approach over a wide area[17], as shown below.

[17] The network externalities come from having more territory and more subscribers using the same approach, making the service more valuable to each subscriber than if the approach differed from subregion to subregion. For example, the same approach may mean that uses of PCS in one subregion are transferable to other subregions. In contrast, customization of PCS approaches to local market conditions may limit the transferability of certain uses while supporting more highly valued local uses.

Table 2

Net benefits from PCS as a function of subregions served by same licensee

Number of subregions served	Net benefits (in $ mil.)
1	1.0
2	2.5
3	4.5
4	7.0

Suppose that four different approaches specialized to meet the unique service needs of each subregion would produce $2.0 million in benefits net of costs for users in each subregion. The total value (or surplus) of using the designated spectrum with somewhat different approaches in each subregion would be $8 million--$1 million more than the value of an area-wide approach with greater scale economies and network externalities. The net benefits of the area-wide and differentiated approaches are compared in Table 3.

Table 3

User Benefits as a Function of Subregions Covered

Number of subregions covered	Net benefits from area-wide licensee (in $ mil.)	Net benefits from different licensees for each subregion (in $ mil.)
1	1.0	2.0
2	2.5	4.0
3	4.5	6.0
4	7.0	8.0

To keep things simple, assume that licensees are able to collect all of the net benefits of their services through the prices they charge. If the PCS license for the entire service area were put up for bid, either in a federal auction or by a private party who won the license in a lottery, the provider with an area-wide approach would be willing to bid up to $7.0 million for it. But, each of the providers with a subregion-specific approach would be willing to bid only $2.0 million for it. So the license would be acquired by the provider with the area-wide approach. Furthermore, it is highly unlikely that the provider with the area-wide approach, once it had the license, would be persuaded to divide it up and sell the subregions to people wanting to implement subregion-specific approaches. If asked by a potential provider with a subregion-specific approach to name a price at which it would be willing to sell the spectrum rights to that subregion, the area-wide provider would have to state a price of no less than $2.5 million--the difference between the value of the approach applied to all four of the subregions and its value if only three subregions are covered. This is far more than a provider with a subregion-specific approach could justify spending.

Even though the license would be more valuable if it was divided up and used for the subregion-specific approaches, an area-wide approach would be implemented unless either (1) there was a single bidder who recognized the total value of the license for the specialized approaches, or (2) potential

service providers from each of the subregions got together to make a joint bid for the license. The single bidder scenario is unlikely to happen in many real world markets for telecommunications services because the knowledge of the needs and conditions for the supply of service in local areas is specific knowledge acquired largely by doing business in those areas--or other areas like them--that is difficult to communicate to others who do not have similar experience. For the proponents of the specialized approaches in the subregions to get together to form a consortium to bid for the license for the entire area, each would have to be aware of the existence of the other three proponents of different approaches that as yet have no commercial presence in the market. This seems unlikely in most situations.

The preceding example with a large service area that could be divided into four distinct subregions shows that starting with small areas is more conducive to the selection of the most beneficial approaches from a number of options. Alternatively, suppose there was only one PCS approach that five firms potentially might offer within a large service area. One firm intends to serve the entire area, while the other four would serve one subregion each. The first firm would benefit from some economies of scale, yielding the pattern of net benefits shown in Table 2 ($1.0 million for one subregion going up to $7.0 million for four subregions). On the other hand, the other four firms might be more efficient at serving each subregion because of their local

focus ($2.0 million in net benefits per subregion). The economies of scale are outweighed by the benefits of the local firms' better understanding of the needs of users in their subregions. As in the case of services targeted to local needs analyzed above, licensing large service areas would also impede the provision of services with more general appeal by more effective local providers.

It is important to note that licensing the subregions independently would not be a barrier to combining them to create a larger area with a single approach if it were beneficial to do so. To continue with the example developed above, if the value of specialized approaches were $1.5 million in each subregion (rather than $2.0 million) and the subregions were each licensed independently, the net benefit to society of PCS service could be increased by $1 million by combining the subregions for an area-wide approach. In this case a potential provider with an area-wide approach could buy the licenses from the licensees with specialized approaches by paying slightly over $1.5 million for each and still clear a profit of almost $1 million. In other words, network externalities, economies of scale, and imperfect information make it difficult to divide a large service area into smaller ones, even when it is beneficial to do so. But these economic forces do not stand in the way of aggregating smaller areas into larger ones when there are advantages to larger service areas.

3. Small service areas will put PCS industry assets in the hands of effective management more rapidly

Small service areas will also facilitate the achievement of the second element of an efficient PCS industry structure--placing the industry's assets in the hands of the most effective owners and managers. An industry's assets are transferred to its most effective managers during the early "shakeout" phase of the paradigmatic stage as the most efficient producers of products and services based on the dominant approach outcompete those who are less efficient. The market can do a better job of identifying effective managers and owners if it starts with a large pool of managerial and ownership candidates. By increasing the number of licenses awarded, small service areas enlarge the initial pool of owners and managers from which those who eventually will run the industry will be selected. It also ensures that the pool of managerial talent will include individuals who understand the importance of the localized nature of the demand for many telecommunications services.

To the extent that the ascent of more effective owners is the underlying force driving industry consolidation, there is no reason to expect that, for industries like cellular or PCS, less spectrum and territory would have to change hands in the long run if larger service areas were awarded. The probability of a service area starting out under the control of effective management should be independent of its size.

Thus the percentage of all territory licensed that would have to be sold to better managers in the long run would be the same regardless of the size of service areas licensed.

4. There is no reason to believe that larger license areas will facilitate the achievement of a more efficient geographic structure for PCS

We have seen that small license areas should facilitate the selection of appropriate technologies and services for PCS and that they should also facilitate the ascendance of effective ownership and management. Therefore, if large license areas better serve the public interest in PCS than small license areas, it can only be because they make easier the achievement of the third characteristic of an efficient industry for PCS--an efficient pattern of geographic concentration. Even then, to advocate larger license areas on this basis it is necessary to show that the benefits of larger license areas for achieving the appropriate degree of geographic concentration outweigh their deleterious effects on the selection of services and technologies and on the development of effective management.

The argument in the NPRM for PCS license areas larger than those licensed for cellular is primarily an empirical argument based on one interpretation of events in the cellular industry. I examine this interpretation very closely in this subsection. The argument for larger PCS license areas also assumes that PCS services will be

sufficiently similar to cellular to warrant a confident generalization from lessons learned in the established industry to policies for the one that is emerging. I examine this assumption as well.

Weak Evidence for Large License Areas from Cellular Clustering. The evidence for significant economic advantages to providing cellular service to areas larger than the MSAs and RSAs licensed is extremely weak. The mere fact that "the system that exists today has effective operating service areas that are much larger than the initial division would imply"[18] does not by itself constitute evidence of economies associated with larger contiguous service areas. As the Commission points out, the nature of LEC set asides created a "*de facto* system of large regional licenses"[19] for the larger LECs. The awards of nonwireline licenses also produced significant clusters of contiguous service areas under common management. However, because certain "large regional licenses" are byproducts of the manner in which licenses were awarded and not outcomes of the interplay of market forces, they cannot be taken as evidence of economic advantages inherent in larger service areas. Only events following the initial allocation of licenses can shed light on the advantages of creating larger effective service areas as an impetus for the industry's consolidation. Here the evidence is mixed at best.

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[18] NPRM, paragraph 56.
[19] ibid.

Comparisons of patterns of cellular system ownership show that clustering has not developed to the scale of MTAs and generally not even to BTAs. Table 4 shows the many separately-owned cellular systems in three randomly selected MTAs (numbers 1 (Atlanta), 24 (Memphis), and 47 (Wichita)) and their associated BTAs. The BTAs, especially the most populous ones, tend to have more than two separately-owned carriers. This pattern does not support the notion that service areas as large as MTAs are necessary to achieve scale economies. It is also worth noting that to the extent that a regional cluster owned by one cellular company overlaps regional clusters owned by other companies, it is generally a pattern of partial overlaps with a number of owners because the clusters have very different boundaries. This means that the owner of a cluster of contiguous service areas faces a number of different owners as competitors in different service areas within its cluster. If MTAs (or BTAs) had been licensed for cellular service, then each MTA (or BTA) would be served by only two owners facing each other everywhere throughout a large region. Each owner would then have to deal with one rather than many competitors, which would make collusion easier. So competitiveness objectives would be better served by awarding smaller license areas, even if the natural geographic unit of operation was larger.

Other Reasons for Consolidation. As the Commission observes in the NPRM, consolidation has proceeded through acquisitions of both neighboring service areas and

Table 4

Cellular Owners and Cellular Service Areas By Trading Areas

Area	1990 Population (000)	Atlanta MTA: Number of Cellular Service Areas		Atlanta MTA: Estimated Number of Separately-Owned Systems*		
		MSAs	RSAs	Total	Wire	Non-Wire
MTA #1 (Atlanta, GA)	6,942	8	21	32**	18	16
BTA #6 (Albany-Tifton, GA)	325	1	4	7	3	4
BTA #22 (Athens, GA)	166	1	0	2	1	1
BTA #24 (Atlanta, GA)	3,197	1	6	11	6	5
BTA #26 (Augusta, GA)	521	1	4	10	5	5
BTA #76 (Chattanooga, TN)	511	1	4	7	4	4
BTA #85 (Cleveland, TN)	87	0	1	4	3	1
BTA #92 (Columbus, GA)	342	1	3	9	6	3
BTA #102 (Dalton, GA)	99	0	1	2	1	1
BTA #160 (Gainesville, GA)	170	0	1	2	1	1
BTA #237 (LaGrange, GA)	64	0	1	3	2	1
BTA #271 (Macon-Warner Robins, GA)	689	1	6	14	8	6
BTA #334 (Opelka-Auburn, AL)	124	0	2	5	3	2
BTA #384 (Rome, GA)	115	0	1	2	1	1
BTA #410 (Savannah, GA)	630	1	5	9	4	5

Area	1990 Population (000)	Number of Cellular Service Areas		Estimated Number of Separately-Owned Systems*		
		MSAs	RSAs	Total	Wire	Non-Wire
Memphis MTA						
MTA #24 (Memphis, TN)	3,500	2	19	19	8	11
BTA #49 (Blytheville, AR)	79	0	2	4	2	2
BTA #94 (Columbus-Starksville, MS	166	0	3	6	3	3
BTA #120 (Dyersburg-Union City, TN)	114	0	2	5	4	2
BTA #175 (Greenville-Greenwood, MS)	214	0	3	6	4	2
BTA #210 (Jackson, MS)	616	1	6	10	3	7
BTA #211 (Jackson, TN)	255	0	2	5	4	1
BTA #290 (Memphis, TN)	1,396	1	8	11	5	6
BTA #292 (Meridian, MS)	200	0	3	6	3	3
BTA #315 (Natchez, MS)	73	0	2	3	2	1
BTA #449 (Tupelo-Corinth, MS)	292	0	2	3	1	2
BTA #455 (Vicksburg, MS)	59	0	2	5	3	2

Area	1990 Population (000)	Number of Cellular Service Areas		Estimated Number of Separately-Owned Systems*		
		MSAs	RSAs	Total	Wire	Non-Wire
Wichita MTA						
MTA #47 (Wichita, KS)	1,125	1	14	12	4	8
BTA #114 (Dodge City, KS)	38	0	1	2	1	1
BTA #163 (Garden City, KS)	65	0	2	2	1	1
BTA #170 (Great Bond, KS)	41	0	1	2	1	1
BTA #187 (Hayes, KS)	61	0	4	2	1	1
BTA #200 (Hutchinson, KS)	125	0	3	4	1	3
BTA #253 (Liberal, KS)	54	0	3	4	2	2
BTA #396 (Salina, KS)	143	0	4	4	1	3
BTA #472 (Wichita, KS)	597	1	6	8	3	6

* Analyzed by majority owner.

** GTE and USCC are both wireline and nonwireline owners within MTA #1.

noncontiguous, stand-alone service areas.[20] Therefore, motives other than placing contiguous service areas under common management must have contributed to the industry's consolidation. This would seem to be reflected in the fact that most of the major cellular carriers own a mix of regional clusters and stand alone service areas.

Consolidation in asset ownership, for whatever reason, will necessarily produce an increase in geographic concentration and the growth of regional clusters when assets are tied to licensed service areas, as they are in cellular. Even if service areas were acquired entirely without regard to location, some clustering would appear as the industry consolidates because even random selections will sometimes draw contiguous service areas. And this will happen with increasing frequency as the industry becomes more concentrated and the acquiring firms occupy progressively more geography.

There are also other mechanisms unrelated to the efficiencies of large license areas that may give rise to some regional clustering. For example, regional clusters might develop if the market for cellular service in any given license area is better understood by owners of nearby areas than by owners of more distant areas. Bids for a license by nearby owners would then incorporate smaller allowances for risk and uncertainty than would bids from more distant

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[20] ibid.

owners--so that nearby owners would win a disproportionate share of these auctions.

Of the arguments offered for why efficiency gains have been driving the trend toward regional concentration in ownership, most prominent have been claims that common ownership of contiguous service areas facilitates sharing of subscriber data bases and resolves conflicts over the pricing of roamer services to customers from nearby service areas. Of course the importance of these claimed economies must be demonstrated empirically, and on the basis of the evidence reviewed above it is hard to conclude that they have exerted a significant influence on the pattern of industry aggregation. Nevertheless, it is worth pointing out that whatever the magnitude of problems with shared data bases and roamer pricing conflicts in the cellular industry, they will be considerably less significant for PCS. The cellular industry has begun to establish formal mechanisms for handling roamer traffic and facilitating beneficial cooperation, including data base sharing, among operators of neighboring service areas. These mechanisms, or others patterned after them, which had to evolve with the cellular industry, will be available to PCS from the outset.

Limited Clustering in Other Industries. Regional clustering among the daily papers owned by the major newspaper chains appears to be an example of clustering that arose independent of any claimed advantages of regional

concentration. Illustrations 1, 2, and 3, attached at the end of this paper, show the locations of daily newspapers operated by the three largest newspaper chains (measured by the number of dailies)--Gannett Newspapers, Thomson Newspapers, and the Donrey Media Group. While there has been considerable (and inconclusive) debate over the benefits of chain ownership in newspapers, the benefits from regional clusters of papers have never been viewed as a critical force driving consolidation. Yet the locations of the papers for each of these chains exhibit distinct regional clusters.[21]

It is worth noting that the once lively debate over the implications of increasing concentration in the newspaper industry due to the growth of chains has cooled considerably because what once seemed to be an inexorable trend toward chain domination of the industry has slowed dramatically while a significant fraction of daily newspapers are still operated as single proprietorships. This should give pause to those predicting that the trends of the last couple of years in the nine year old cellular industry are sure portents of a future industry dominated by firms managing regional clusters of service areas.

Cable television is an example of a communications industry with a pattern of regional clustering similar to that seen in the newspaper industry. The cable industry

[21] If the appropriate RSA or MSA were shaded in for each paper identified on this map, regional concentration in newspapers would appear to be much greater than what is suggested by the maps used to show the geographic coverage of the larger cellular operators.

developed from small license areas (often municipalities). Distinct regional clusters mixed with isolated stand alone systems are evident in the following maps showing the counties in which the three largest multiple system operators (MSOs) own cable systems.[22] (See Illustrations 4, 5, and 6 at the end of this paper.) Again, industry clustering has not risen to the scale of MTAs or even BTAs, as shown in Table 5. As with newspapers, clusters have arisen independent of claims that they produce economic benefits.

5. There is no advantage to mixing large and small license areas

The preceding analysis has shown that large license areas slow experimentation and impede the process of identifying better managers. Awarding large license areas cannot guarantee that the recipients will be best qualified to develop and operate them. These disadvantages offset possible advantages of having large license areas. Furthermore, there is no way to know how many most-effective PCS approaches and best-qualified managers will be local and how many will cover a larger area. Given the problems raised above that make it more difficult to break up large license areas than to assemble large service areas from small ones, there are clear advantages to starting out with small license areas. Because we don't know what is most efficient, it is

[22] Sources for the information represented in Illustrations 4,5, and 6 are the *Cable and Station Coverage Atlas* (1992) and *Broadcasting and Cable Marketplace* (1992).